QUARTERLY OPERATING REPORT
Fourth Quarter 1976
DLCS 5000476

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DISCLAIMER

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Preface

This Quarterly Report is prepared and issued by the Duquesne Light Company to disseminate information relative to all significant activities conducted at the Shippingport Atomic Power Station. Consistent with the premise that Shippingport was built to provide information and not power at competitive costs, this report makes no effort to analyze power production costs and makes no deductions regarding costs which might be achieved if Shippingport had been built and operated solely to produce power.

In preparation of these reports, it has been presumed that the reader has a working knowledge of nuclear reactors, reactor technology and/or electric utility generating station operations. The reader is reminded, however, that this is an operating report rather than a technical report. Anyone desirous of obtaining information on recent technical progress related to the nuclear portion of the Shippingport Atomic Power Station is therefore referred to the United States Energy Research and Development Administration, Division of Technical Information Extension at Oak Ridge, Tennessee, where this information is readily available.

1. SUMMARY OF OPERATIONS

During the fourth quarter of 1976, the Shippingport Atomic Power Station remained shutdown for PWR/LWBR (Pressurized Water Reactor/Light Water Breeder Reactor) core conversion. The PWR Core remains in storage in the deep pit of the Fuel Handling Canal. The LWBR core barrel has been installed in the reactor vessel. The first core blanket assembly was installed in the core barrel on December 10 and a second blanket assembly was installed December 29. A seed assembly was installed in the core barrel on December 11 and a second seed assembly was installed on December 30. At the beginning of the quarter the 1A, 1B, 1C and 1D reactor coolant loops were drained with a nitrogen purge established. The 1B, 1C and 1D steam generators were in a wet lay-up condition and recirculating on the reactor plant cooldown and temperature control heat exchanger. The 1A steam generator was in a partial drain condition with a nitrogen purge established. The pressurizer was drained and isolated from the reactor vessel.

At the beginning of the quarter the reactor vessel water level was being maintained at 699'6" $\pm$ 1'. On October 10, the level was raised to 704' and then on November 11 the level was lowered to 685'5". The reactor vessel water level was maintained at 685'5" for the remainder of the quarter to allow for dry fuel installation.

The 1C main coolant pump replacement was completed on October 22. Removal of the 1A main coolant pump was started October 21. Both the 1A and 1C main coolant pumps were removed for corroded thrust bearing shoe repairs and thrust runner repairs. The 1A main coolant pump remained out of the system for the remaining portion of the quarter.

During the fourth quarter, 5 year hydrostatic testing and upgrading equipment system acceptance tests were performed. System flushes were conducted during the quarter and support was provided to other system and equipment tests.

During the fourth quarter recertification training for nuclear control operators and supervisors was conducted.

During the fourth quarter of 1976, 1942 cubic feet of radioactive solid waste was shipped off-site for burial. These shipments contained about 0.1 curie of radioactivity.

2. CHEMISTRY

During the fourth quarter of 1976, the Chemistry section maintained specifications in various plant systems and fulfilled station manual requirements.

Reactor Plant

The 1A, 1B, 1C and 1D reactor coolant loops remained in a drained dry lay-up condition during the entire fourth quarter. The only out-of-specification condition in the Reactor Plant Auxiliary Systems was a low pH in the canal waters as a result of insufficient recirculation and the absorption of carbon dioxide. Continued recirculation through the canal water demineralizers removed the carbon dioxide and raised the pH to within specifications. Refer to Table I. Preparation for the reactor core installation continued throughout the quarter.

Turbine Plant

The Station has been shutdown for the entire quarter. The four heat exchangers, 1A, 1B, 1C and 1D, remained in a cold wet lay-up condition. The only out-of-specification condition which occurred was that of a high hydrazine concentration in the 1B and 1C heat exchangers. The high hydrazine concentration of the 1B and 1C heat exchangers was a result of insufficient recirculation of the heat exchangers after treatment with hydrazine. Additional recirculation corrected the condition. Refer to Table II.

Radioactive Waste Disposal System

The total radioactivity, exclusive of tritium, discharged from Shippingport during the quarter was 0.000029 curie which is 0.002 % of the allowable limit. The quantity of 0.0016 curie of tritium was an insignificant 0.0002% of the allowable limit. These radioactivity releases from Shippingport are far too small to have any measurable effect on the general background environmental activity outside the plant.

TABLE I
REACTOR PLANT AUXILIARY SYSTEMS

WATER CONDITIONS

SYSTEM	Conductivity µmhos/cm	pH at 25° C	CONC. - ppm			Gross Gamma Activity µCi/ml
			CrO_4^{--}	Cl^-	Dis. O_2	
Component Cooling Spec.	N.P.	N.P.	500 - 1000	1 max.	N.P.	N.S.
Observed	N.P.	N.P.	511 - 647	0.40	N.P.	<MDA** 8.04×10^{-7}
Coolant Charging Water Specifications	2.5 max.	6.0 - 8.0	N.P.	0.1 max.	NOTE*	N.P.
Observed	1.48	6.29 - 7.87	N.P.	<0.10	0.34 - 2.2	N.P.
Canal Water Specifications	5.0 max.	5.8 - 8.0	N.P.	N.P.	N.P.	NOTE*
Observed	2.1	5.66*** - 5.91	N.P.	N.P.	N.P.	4.51×10^{-7} - 2.73×10^{-5}

* There is no specification for current plant conditions.
** MDA = 1.57×10^{-7} µCi/ml
*** See Reactor Plant Section of QOR

N.S.: No limit needed; therefore, no limit has been specified.
N.P.: Analysis is not required and not performed.

TABLE II

Non-Operating Heat Exchangers

Cold Lay-up

Water Chemistry

Water Conditions	Specifications	Non-Operating Heat Exchangers			
		1A	1B	1C	1D
1. Conductivity Max. µmhos/cm	30	20	24	24	24
2. pH @ 25°C Min.	9.50	9.50	9.53	9.54	9.50
Max.	10.50	9.72	9.81	9.79	9.79
3. Chloride ppm Max.	0.5	0.25	0.20	0.20	0.20
4. Hydrazine ppm					
Min.	50	63	59	59	59
Max.	100	100	127*	114*	100
5. Chemicals used in pounds:					
N_2H_4		10	41.6	32.7	45.8
C_4H_2NO		0	0	0	0

*See Turbine Plant Section of QOR.

3. MAINTENANCE

Repairs of major components, as well as routine maintenance on equipment, instruments, controls and preventative maintenance were performed during this period. Major work items completed or in progress during this period are summarized as follows:

Main Unit Turbine

Westinghouse has completed the majority of work on the main unit turbine with the exception of a few deficiencies and open items. A procedure for lay-up of the Turbine has been initiated.

Main Unit Generator

Westinghouse has completed the majority of work on the main unit generator and exciter with the exception of a few deficiencies and open items. The dehumidifier for protecting the generator was removed, and the generator is now being purged with control air.

Pressurized Water Reactor Components

The pressurized water reactor core barrel and fuel assemblies remain in the fuel handling canal.

Preconditioning

Preconditioning has been completed. The reactor vessel filter and the test head have been shipped.

"1C" Loop Main Coolant Pump

The "1C" MCP has been repaired and installed in the 1C coolant loop.

"1A" Loop Main Coolant Pump

The "1A" MCP was removed from the system to correct deficiencies.

Plant Modification and Improvements

Construction continued on a diesel generator system and on an auxiliary control room. Construction continues on the Safety Injection System piping during this quarter. Work continued on the general upgrading of plant systems.

Refueling

Stationery fuel assemblies (blankets) are being received and installed along with the movable fuel assemblies (seeds) into the reactor vessel. The trial fit program on the LWBR head components remains in progress.

4. TEST PROGRAM

During the fourth quarter the following test procedures were performed or were in progress to support plant recovery:

1. LWBR-DLCS 53302 - Flywheel Generator/Pump Coastdown Test
2. LWBR-DLCS 61801 - Periodic Calibration of Total Feedwater Flow and Temperature Instrumentation
3. LWBR-DLCS 62201 - Initial Checkout of Steam Pressure Instrumentation
4. LWBR-DLCS 65801 - Initial Checkout and Calibration of the Axial Flux Measurement System
5. LWBR-DLCS 72516 - Valve Operating System Icing Investigation
6. LWBR-DLCS 72518 - Operation of the Reactor Vessel Dewatering System During Fuel Installation
7. LWBR-DLCS 72527 - Flush of the Processed Water Reuse System
8. LWBR-DLCS 73214 - Hydrostatic Test of the Processed Water Reuse System
9. LWBR-DLCS 73215 - Inspection of RWPS Vent Gas Decay Drums (Pneumatic Test)
10. LWBR-DLCS 73220 - DNLM System Five Year Hydro Test
11. LWBR-DLCS 73225 - Hydrostatic Test of Boiler Sample Line to RPC Gravity Drainage Tank
12. LWBR-DLCS 73230 - Pressure Test of Flash Tank
13. LWBR-DLCS 73232 - Hydrostatic Test of Component Cooling Water Supply and Return Hoses (Bench Test)
14. LWBR-DLCS 73240 - Coolant Charging System Five Year Hydrostatic Test
15. LWBR-DLCS 73241 - Five Year Hydrostatic Test of the Valve Operating System
16. LWBR-DLCS 73301 - Plant Conditions for Core Barrel Installation
17. LWBR-DLCS 74101 - Preliminary Source Range Nuclear Instrumentation Reliability Check
18. LWBR-DLCS 74210 - Proof of Flow of Boiler Blowdown and Sample Lines

4. TEST PROGRAM (Continued)

19. LWBR-DLCS 74214 - Flushing of Coolant Sampling System Container Isolation Valves

20. LWBR-DLCS 74304 - Hydrostatic Test of the SIS Connection to the RPC Drainage System

21. LWBR-DLCS 74312 - Pneumatic Test of the Flash Tank Vent Line Modifications

22. LWBR-DLCS 74313 - Pneumatic Test of Control Air Line to Auxiliary Chamber

23. LWBR-DLCS 74314 - Pneumatic Test of Service Air Modifications

24. LWBR-DLCS 74318 - Hydrostatic Test of New Reactor Pressure Instruments (453-05-J1-4001 & 4002)

25. LWBR-DLCS 74319 - Hydrostatic Test of Charging System - Decay Heat Removal System Tie Line

5. GLOSSARY

AIX . . . . . after ion exchanger (outlet)

a/o . . . . . atomic percent

BAPL . . . . . Bettis Atomic Power Laboratory

BIX . . . . . before ion exchanger (inlet)

CIC . . . . . compensated ionization chamber

DAS . . . . . Data Acquisition System

DE . . . . . demineralizer effluent

DF . . . . . decontamination factor

EFPH . . . . . equivalent full power hour

ERDA . . . . . Energy Research and Development Administration

Hc . . . . . critical height

HDS . . . . . Heat Dissipation System

LWBR . . . . . Light Water Breeder Reactor

magamp . . . . . magnetic amplifier

MDA . . . . . Minimum Detectable Activity

mR . . . . . milliroentgen

mrem . . . . . milliroentgen equivalent man

NPS . . . . . Nuclear Protection System

ORMS . . . . . Operational Radiation Monitoring System

PWR . . . . . Pressurized Water Reactor

QOR . . . . . Quarterly Operating Report

5. Glossary

R	roentgen
RC	resistance capacitance
RCS	Reactor Coolant System
rem	roentgen equivalent man
RPC	Reactor Plant Container
RWPS	Radioactive Waste Processing System
STP	standard temperature and pressure
su	smear unit (100 sq. cm.)
Tavg	average reactor coolant temperature
Tc	reactor inlet coolant temperature
Th	reactor outlet coolant temperature
Ts	time of sample isolation
µCi	microcuries
v/o	percent by volume
VOS	Valve Operating System

ABSTRACT

During the Fourth Quarter 1976 report period, Shippingport was shutdown for fuel installation and plant modification required for the Light Water Breeder Reactor Program. The Station efforts were directed toward plant maintenance and preparations for testing the new or modified plant systems. The report presents a summary of events which occured in operations, chemistry, maintenance and testing.